

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,414,416 B2
APPLICATION NO. : 10/506518
DATED : August 19, 2008
INVENTOR(S) : Watkins, Jr. et al.

Page 1 of 10

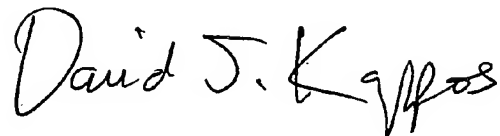
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

The title page, showing an illustrative figure, should be deleted and substitute therefor the attached title page.

Formal drawings (Sheets 1-8), attached, replace informal drawings (Sheets 1-8) as issued.

Signed and Sealed this

Twenty-ninth Day of June, 2010

A handwritten signature in black ink that reads "David J. Kappos". The signature is written in a cursive, flowing style.

David J. Kappos
Director of the United States Patent and Trademark Office

(12) **United States Patent**
Watkins, Jr. et al.

(10) **Patent No.:** **US 7,414,416 B2**
 (45) **Date of Patent:** **Aug. 19, 2008**

(54) **ELECTRICAL CONDITION MONITORING METHOD FOR POLYMERS**

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(73) Assignee: **Polymer Aging Concepts Inc.**, Dahlonega, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 108 days.

(21) Appl. No.: **10/506,518**

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§ 371 (c)(1),
 (2), (4) Date: **May 9, 2005**

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PCT Pub. Date: **Sep. 18, 2003**

(65) **Prior Publication Data**

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Related U.S. Application Data

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(51) **Int. Cl.**
G01N 17/00 (2006.01)
G01N 33/44 (2006.01)
G01N 27/04 (2006.01)
G01N 27/20 (2006.01)
G01R 31/12 (2006.01)

(52) U.S. Cl. 324/693; 73/866; 324/71.1; 324/543

(58) **Field of Classification Search** 73/865.9-866, 73/865.6, 786, 802; 324/543-544, 693, 691, 324/541, 555, 71.1
 See application file for complete search history.

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(57) **ABSTRACT**

An electrical condition monitoring method utilizes measurement of electrical resistivity of an age sensor made of a conductive matrix or composite disposed in a polymeric structure such as an electrical cable. The conductive matrix comprises a base polymer and conductive filler. The method includes communicating the resistivity to a measuring instrument and correlating resistivity of the conductive matrix of the polymeric structure with resistivity of an accelerated-aged conductive composite.

45 Claims, 8 Drawing Sheets

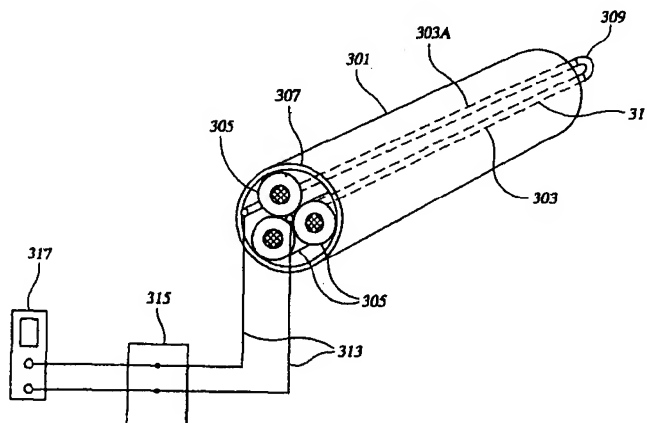


FIG. 1A

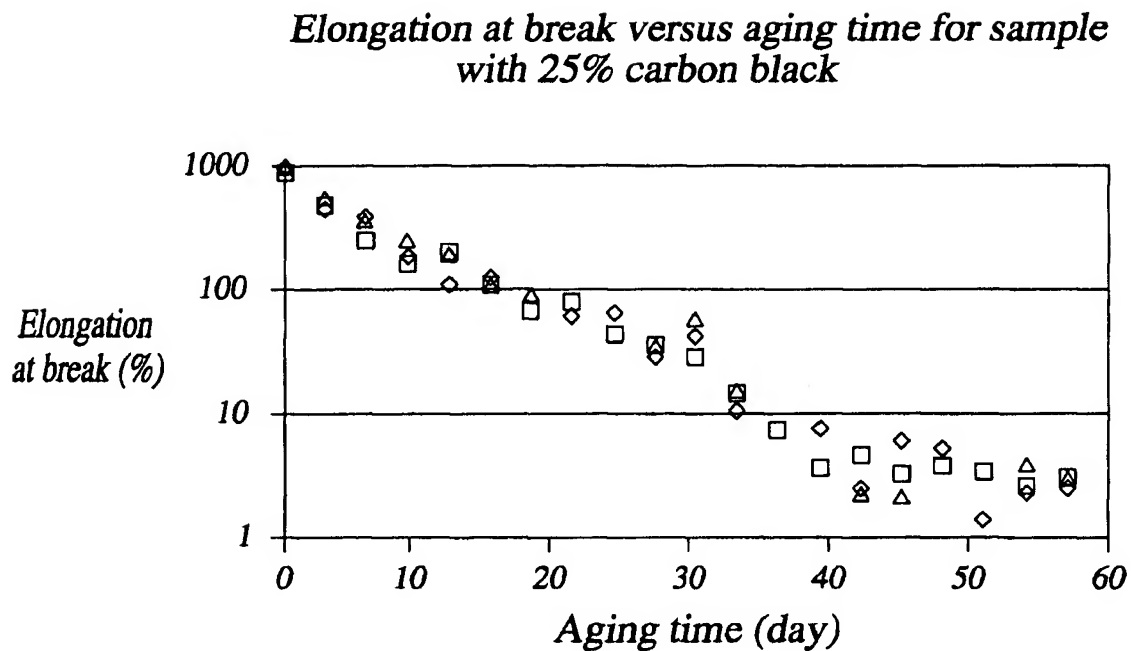


FIG. 1B

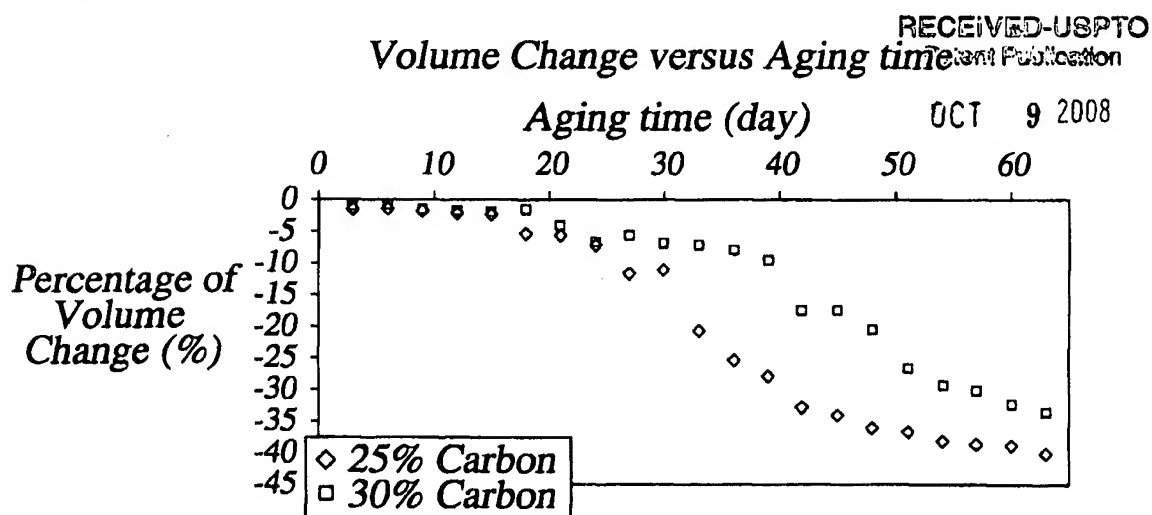


FIG.1C

Density of sample with 25% carbon black versus aging time at 125C

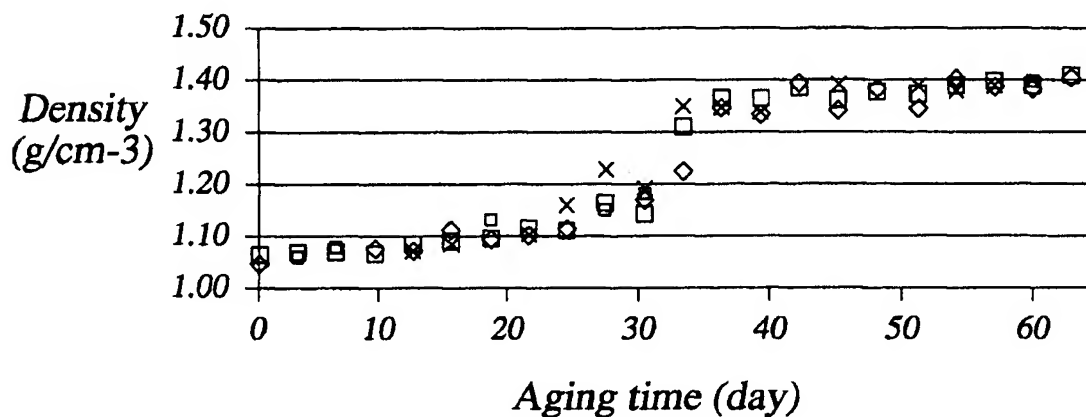


FIG.1D

Restivity versus aging time for sample with 25% carbon black loading (aging temperature: 125C, measured one day after the sample was taken out)

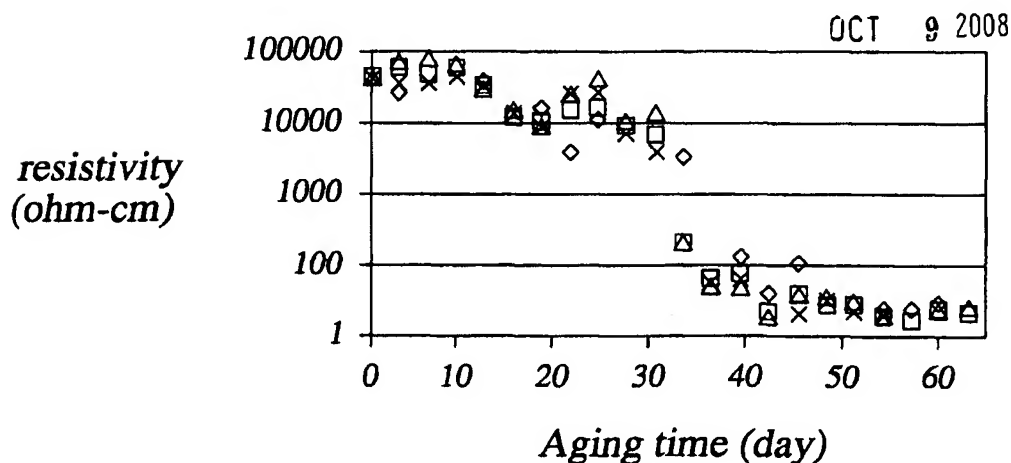


FIG.2A

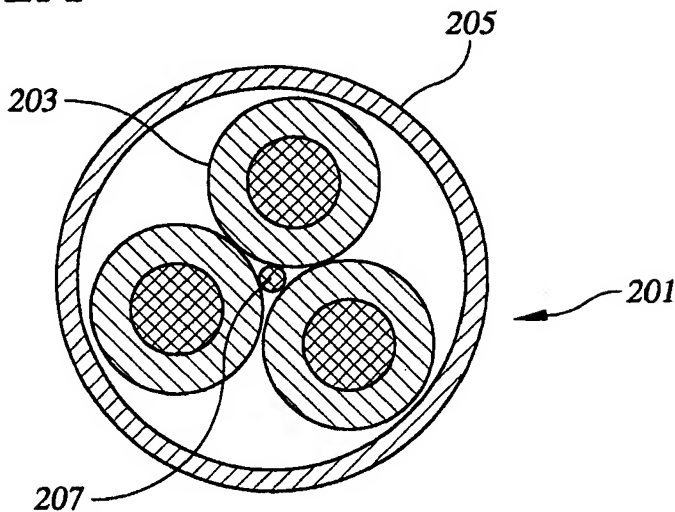


FIG.2B

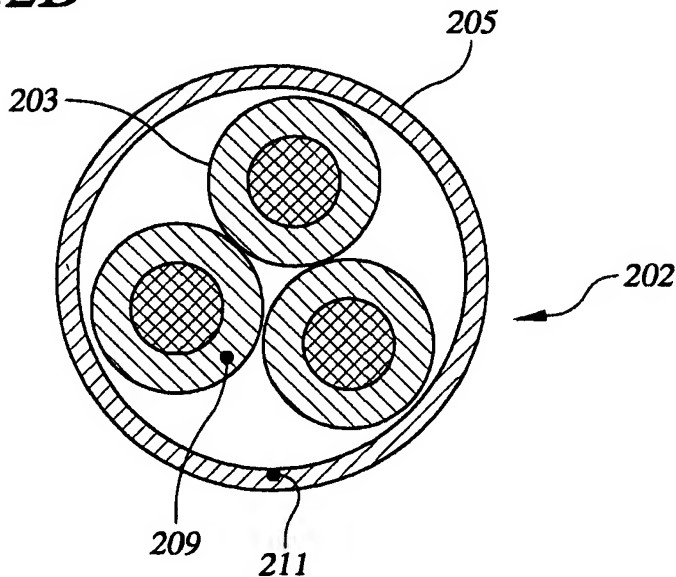
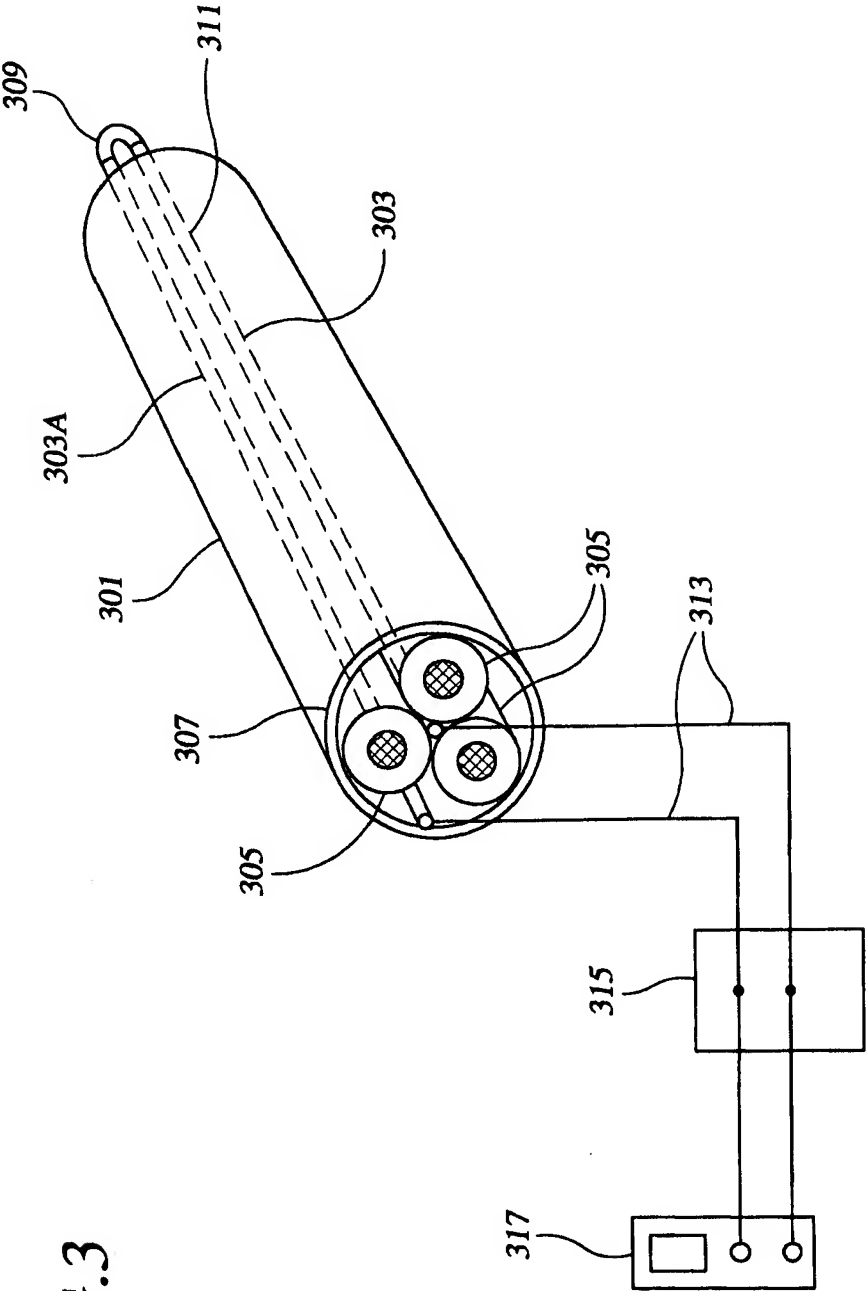
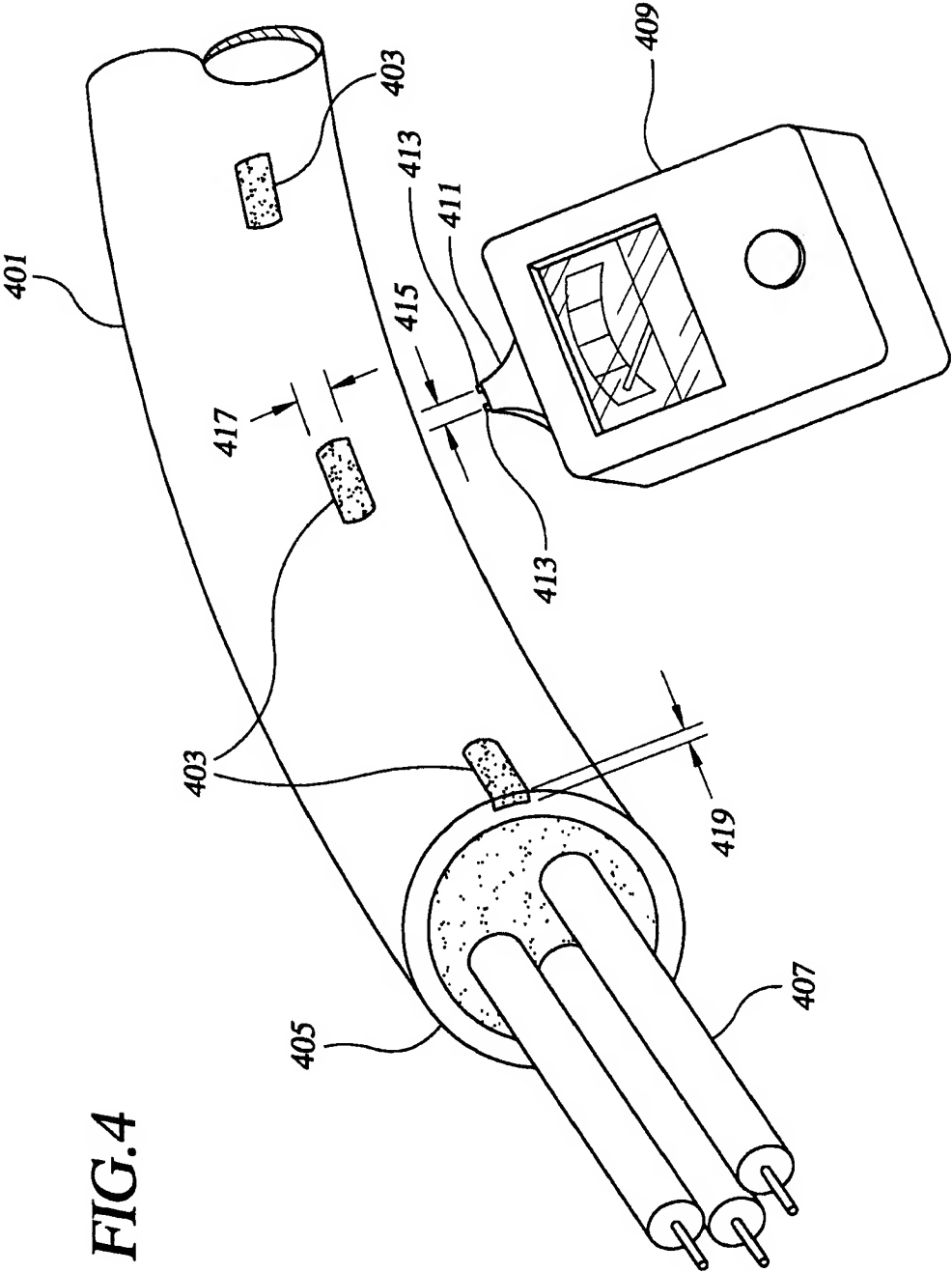


FIG. 3





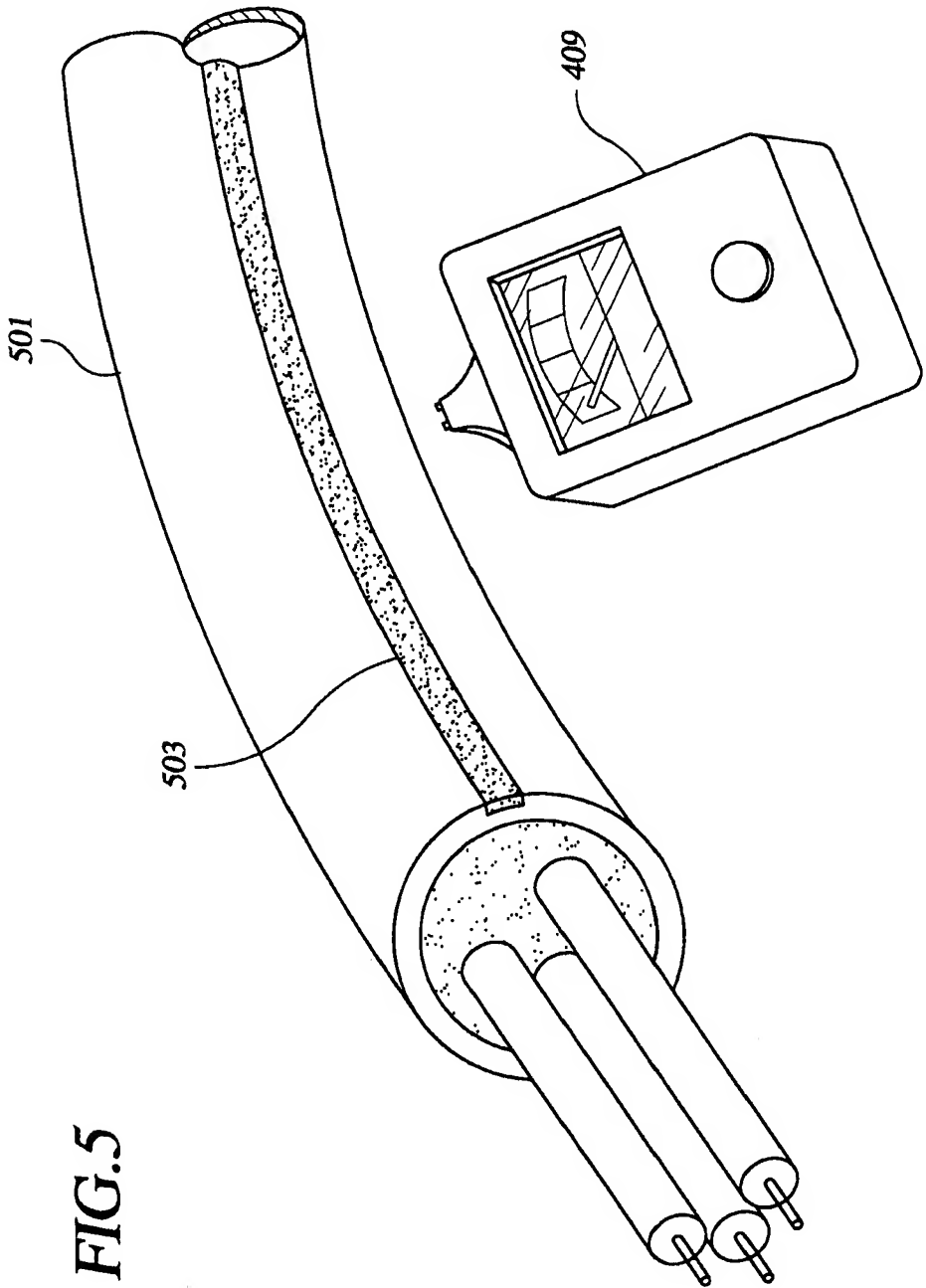


FIG. 6

